Major Powell explained that the U.S. Survey system is very economical when the colour patterns are transferred to stones.

Prof. T. McK. Hughes thought it very difficult to devise a scheme that will meet the demands of everyone. Some reference must be had to the permanence of the colours, the readiness with which they can be applied, and the distinctness with which they show what is desired. He thinks the fittest scheme must survive.

In the afternoon, brief lectures were given by Prof. Chamberlin, Mr. Gilbert, Major Powell, and Mr. Emmons upon the geology of the country to be traversed by the long excursion.

SIXTH DAY.—A Committee on International Bibliography was appointed.

The Secretary announced that Messrs. Golier and Schmidt convey an invitation from the Swiss Government to hold the sixth International Congress, in 1894, in Switzerland. Mr. Golier delivered an address in which he presented the invitation, and the Congress unanimously accepted it. The following Swiss members were appointed a local committee, with power to add to their number and to appoint the time and place of meeting: viz. Messrs. Heim, Renevier, Lang, Balzer, Schmidt, and Golier. On the motion of Prof. Pumpelly, a vote of thanks was passed to the Swiss Government and delegation. It is thought that Berne will be selected as the place of meeting.

The Geological Survey of Russia sent an invitation to hold the seventh Congress in Russia. The Czar joined in the invitation. Prof. Tschernychew made the formal presentation of the subject to the Congress. A vote of thanks to the Survey and the Czar was passed, and the Secretary of the Congress was authorized to send a despatch by cable, transmitting the vote.

The President of the Congress, Prof. Le Conte, delivered a brief closing address, summarizing the work of the session, and after passing several votes of thanks the Congress adjourned.

THE SOCIETY OF FRIENDS OF ASTRONOMY AND COSMIC PHYSICS.

THE Society of Friends of Astronomy and Cosmic Physics, founded May 19, 1891, has been formed with a view to the organization of systematic activity and co-operation in research in the subjects named. It is intended to embrace, chiefly, workers in astronomical science in Germany, Austro-Hungary, Switzerland, and other neighbouring countries, and natives of these countries in the colonies and elsewhere. Members of other nationalities are, however, offered a welcome.

The head centre of the Society is Berlin. The subscription is 5 marks.

Communications are invited from individual members, which will be published together with the notices of meetings and other business of the Society. These publications will bear the title "Mittheilungen der Vereinigung von Freunden der Astronomie und kosmischen Physik"; they will be numbered consecutively, and will be supplied to all members gratis, but will not be issued at regular or stated intervals.

These communications will form at present the only direct publication of the Society, until it is formed on a more substantial financial basis and consists of a larger number of members (in the first four weeks the number rose from 50 to over 100). Contemporaries are at liberty to borrow any matters of interest contained in the Society's communications, of course acknowledging the source from which they are derived.

Endeavours will be made to keep the Society carefully within the limits in which alone it can be successfully active, leaving on one side other closely related branches: for instance, those of the Meteorological and Photographic Societies; but, nevertheless, endeavouring to preserve the closest amity and co-operation with the related Societies.

The Astronomische Gesellschaft, founded in Germany in 1863, is regarded by the new Society as the principal Society, whose office it is to foster astronomical research throughout the whole earth. The new Society bears the same relation to this international association as do those Astronomical Societies already established in England, France, Russia, and North America.

The principal object of these smaller societies is to collect observations made in the largest possible number of districts, inasmuch as researches in astronomy and cosmic physics are very largely dependent on the state of the weather, and the relation of the place of observation to the phenomena in the heavens.

In the new Society the following branches of work have been selected:—(1) Observations of the sun; (2) of the moon and surface of the planets; (3) of the intensity and colour of the light of the stars and of the Milky Way; (4) of the zodiacal light and meteors; (5) of the polar light, magnetism of the earth, earth currents, and air electricity; (6) of the clouds and halos, and thunder and lightning (care being taken in the two last groups not to encroach upon the ground already covered by the Meteorological and Photographic Societies).

Each of these groups is presided over by a member of the Society whose attention is especially directed to the respective subject. The duty of these Presidents is to organize the correspondence, hold branch meetings, and preserve the connection which binds each group to all the others.

The Society will endeavour to further the organization of all these researches, not merely by the publication of communications and by correspondence, but also by advice and aid in the providing of apparatus, especially of suitable optic, electric, and magnetic measuring instruments, charts, books, &c.

The statutes of the Society will be sent post free on application to the Secretary, Herrn Cand. G. Witt, Berlin, N.W., Invalidenstrasse 57.

The President of the Society is at present Prof. Dr. R. Lehmann-Filhés, Berlin, W., Wichmannstrasse 11*a*.

The Committee consists of the six members presiding over the several groups of research.

The Librarian of the Society is Herr Dr. P. Schwahn, Berlin, N.W., Invalidenstrasse 57; and the Treasurer, to whom subscriptions should be sent, Herr Rendant Bruck, Berlin, N.W., Invalidenstrasse 57.

THE PROTECTIVE DEVICE OF AN ANNELID.

AMONGST a gathering of small Serpulids, &c., received from Mr. Sinel, of Jersey, I find some interesting little worms related to the Sabellidæ. They build a thin membrane-like tube, about one-seventieth of an inch in diameter, coated externally with flat translucent particles of sand. Its lower end is closed, and embedded in sponge or other growths, but the upper end is free, and, when the head of the inmate is protruded, stands about a quarter of an inch high in the water. On this head are two branchial tufts, each having five branches beset with a double row of long ciliated filaments. When all are fully expanded they curve backwards, and cover an area of about one-tenth of an inch in diameter. The branches decrease in size from the inner to the outer pairs, and at the back of the longest but one in each tuft, near its base, is a chocolate or brown coloured vesicle. The two smallest branches curve backwards round the mouth of the tube, and keep up a constant whipping or flicking motion.

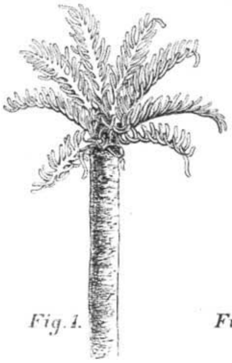
Fig. 1.

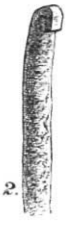
Fig. 2.

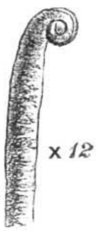

Fig. 3.

But the peculiarity is, that, upon the retreat of the animal, the mouth of the tube not only instantly closes flatly and tightly by collapse of the sides, but the tube itself, beginning at the tip, proceeds to coil up like a spiral spring, looking very much like a young fern-frond. This is, of course, an effectual protection against the intrusion of enemies, and the coiling and uncoiling, which I have witnessed many times, is a most curious sight.

Fig. 1 shows the branchial tufts expanded. Fig. 2, tube beginning to coil up. Fig. 3, tube partly coiled up—a process which is

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sometimes continued much further. I do not know whether this annelid has previously been noticed or described, but, if so, I shall feel obliged to any of your readers who can refer me to a description. ARNOLD T. WATSON.

Sheffield, August 19.

GEOGRAPHY AT THE BRITISH ASSOCIATION.

THERE was at least one very satisfactory feature about the Geographical Section at the Cardiff meeting. It has been the practice in all the other Sections to appoint as Presidents men who have gained a high reputation as specialists in their own departments. For some reason this practice has not been followed in the Geographical Section. True, in past years we have had such men as Murchison, Markham, Galton, General J. T. Walker; but too often the President of this Section, while eminent as a soldier, or a colonial Governor, or as a Society man, has known as much about geography as "the man in the street." It must be admitted that this has in part arisen from the fact that scientific geographers in England could have been counted on the fingers of one hand. Happily, through the recent efforts of the Royal Geographical Society, this is ceasing to be the case, and when the Chairs at Oxford and Cambridge, and the other influences which are at work, have had time to produce results, geography, in one or other of its aspects, may become as much of a career in England as it is in Germany. It was regarded as to some extent a triumph, and an earnest of what is coming, that the President of the Section at Cardiff was a geographer pure and simple. Mr. E. G. Ravenstein has long been regarded as the one scientific cartographer in the United Kingdom (where he has been naturalized for many years); and as a geographer, in the best sense of the term, he is not surpassed. It was natural that in his address he should deal with the progress of the subject in which he is master. His address, while ostensibly dealing with cartography, really showed the growth of our conception of the earth's surface, and indicated the most profitable aspects in which we may deal with that department of knowledge whose business it is to investigate.

Amid a good deal that was trivial, and notwithstanding the usual modicum of sensation, Section E did some solid work at Cardiff. The fact is that the only incident which could be regarded as sensational was the appearance on the platform of Mrs. French Sheldon, evidently suffering greatly from the accident with which she met on her return from Kilimanjaro. But Mrs. Sheldon was able to tell us some things about the people in East Africa that had never come within the ken of the male traveller. Moreover her account of the curious crater lake Chala, at the south-east foot of Kilimanjaro, was a real contribution to geographical knowledge. With immense difficulty she and her companion descended the dense vegetation which covers the precipitous sides of the crater, and navigated the tiny lake on a raft, which was continually in danger from the swarms of crocodiles. Mrs. Bishop (Miss Isabella Bird) was anything but sensational. With perfect calmness and clearness she gave an account of an almost unexplored portion of the Bakhtiari country visited by her, and especially of its interesting inhabitants. Miss E. M. Clerke's paper on the aborigines of Western Australia was more suited to the Anthropological than the Geographical Section, and still more suited to a missionary meeting.

Mr. John Coles's paper on the art of observing showed how comparatively easy it is for any man of average intelligence, and even pupils in the higher classes of our schools, to acquire a knowledge of the use of the more common survey instruments. An excellent paper on the homology of continents was read by Dr. Hugh Robert Mill, who showed that in many respects there is a remarkable family likeness among the continents, arising from the fact that they have been subjected to essentially the same influences. Mr. Silva White, in his paper on the comparative value of African lands, attempted, by a statistical method, to indicate the lines of least resistance against the European domination in Africa. Mr. Miller Christy gave an elaborate and highly instructive paper on the absence of trees from prairies; his conclusion being that the main cause of the treelessness of American prairies has been forest fires. The paper was highly suggestive, showing, as it did, that if proper measures were taken even our great deserts might be made to blossom as the rose.

The greater part of one morning was devoted to a discussion on acclimatization, introduced in a valuable paper by Dr. Robert Felkin. The author showed that there are two schools of thought, the one regarding acclimatization as impossible, the other more sanguine and pronouncing it possible. Probably the truth will be found to be a mean between the two. In considering the subject, it is necessary to specify, first, the various nations who are to be acclimatized, and secondly, the places where they are to be located. As regards the first point, the national characteristics, habits, customs, and environment must be taken into account, and with respect to the second, the nature of the country, its climatology, its inhabitants, their mortality and endemic diseases must be brought under survey. The next point is to classify the various European nations, and it becomes evident that they can only become readily acclimatized in the temperate zone, where climatic and other conditions are approximately akin to their present habitat. In reference to Europeans becoming acclimatized in the tropics, what are those factors which prevent it, or which must be overcome before it is possible? They are as follows: heat, cold, damp, various endemic diseases, especially malaria, and those constitutional conditions induced by climate which either destroy the immigrants or diminish their fertility after one or two generations. Progress has been made during recent years in enabling persons to reside longer and to enjoy greater health in the tropics. What probability is there that science will accomplish still more in rendering acclimatization possible for Europeans in tropical countries? It must be said that both Dr. Felkin and those who followed him in the discussion occasionally lost sight of the real point at issue. The adaptation of a European to tropical conditions for a few years is one thing; the acclimatization of a race in a climate totally different from that which has been its inheritance is another. About the former there need be now no difficulty: what scanty experience we have leads to the conclusion that the latter is practically impossible. What we really want are experiments continued over three or four generations.

Colonel Holdich, of the Indian Survey, gave some valuable hints in his paper on the application of Indian geographical survey methods to Africa. An outline of the methods proposed may be summarized as—(1) The adoption of a rapid system of triangulation along the most important lines for first survey. (2) The extension of a graphic system of mapping from these lines by means chiefly of native labour. The most important lines for first survey are the international boundary lines. Until lately England has been peculiarly free from the necessity of demarcating or maintaining national boundaries. Even India offers but a comparatively short line for defence. The new partition of Africa largely increases her responsibilities in this respect, though there may be no immediate cause for action. There is, however, a great necessity for a topographical acquaintance with the boundaries adopted. Only a small portion of them apparently follow permanent natural features, the rest being defined by rivers, &c. It would appear, then, advantageous to commence triangulation along the boundary lines. This is, however, so far a national or international question, and consequently in these preliminary stages of survey State assistance might very well be expected, and Imperial resources drawn upon for carrying it out. (1) What are these resources? (2) What is the nature of surveys already existing in Africa? (3) What is the nature of the survey we ought to build up? Replying to (2) and (3), we find that if a continuous and comprehensive scheme is to be adopted, with unity of design for all the scattered districts of the African colonial system, nothing has been done as yet which would assist us in carrying out our scheme. This scheme should be largely borrowed from experiences in Asia. A consideration of it shows, in reply to (1), to what extent Imperial survey resources might be utilized during the processes of laying out the preliminary lines of triangulation. From this triangulation the extension of topography would thereafter probably depend on private enterprise. Then followed a short consideration of the general topographical processes as carried out by natives of India, of the value of such native labour, and of the possibility of raising survey establishments in Africa similar to those which have done such excellent work in Asia.

The subject of reform in our Ordnance Survey was again introduced this year in an elaborate paper by Mr. H. T. Crook, who was strongly supported by a number of speakers. Mr. Crook pointed out many defects in the large-scale maps. Some of them are notoriously behind date; they are issued in a most

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